

# Networking and Remote Data Access

Report on ESnet Blueprint Meetings and New Activities

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**4th US ATLAS HPC Meeting at LBL**

# Overview

Two items to cover

- 1) The ESnet/US ATLAS/ US CMS network blueprint activity summary
  - a) But already covered by Chin
- 2) New activities and future networking activities relevant to HPC

# Network Blueprint Activities

Both US ATLAS and US CMS have been having ~monthly meetings with ESnet to discuss use of ESnet since mid 2018

- Focus has been on the **rate of increase of trans-Atlantic network use**
- Additional discussions about identifying type, mode and source of traffic (gridFTP, xrootd, CMS, ATLAS, copy, direct access, Tier-1, Tier-2, etc)

Meeting notes are available at

<https://docs.google.com/document/d/1znq0gXq-OsPyw0km0JygVDQM0ZQK806jXOQcACTURIQ/edit?usp=sharing>

Refer to Chin's Slides :)

# TA Traffic Summary

Richard Cziva provided a good summary in his presentation to the LHCOPN/LHCONE group in Umea in June

[https://docs.google.com/presentation/d/1Y20-gJreMPzfvIm6YduwlrwvpDh0DdKc8RXo7L6iDxU/edit#slide=id.g58deb80b8e\\_0\\_2](https://docs.google.com/presentation/d/1Y20-gJreMPzfvIm6YduwlrwvpDh0DdKc8RXo7L6iDxU/edit#slide=id.g58deb80b8e_0_2)

Have a look to see various plots providing details about the TA traffic

Blueprint meetings continue monthly, discussing:

- Traffic identification: how to better label/identify traffic components
- WLCG workflow analysis: are we using the network efficiently?
- Traffic forecasting
- We can add HPC impacts as part of future discussions

# Ongoing and New Network Activities

For the last year there has been a [HEPiX Network Function Virtualization](#) working group. **Mandate:** Identify use cases, survey existing approaches and evaluate whether and how SDN/NFV should be deployed in HEP. In particular:

- Explore SDN/NFV approaches for DC networking, e.g. SDN for OpenStack/Kubernetes
- Explore SDN/NFV approaches for distributed storage/end-to-end transfers (e.g. AMLight, SENSE, Bigdata Express, AmoebaNet, etc.)
- Work organised in **two phases**, **Phase I** (exploratory):
  - Detail use cases relevant for HEP
  - Phase I report to be presented [next month at HEPiX](#)
- **Phase II** is the prototyping and implementation phase:
  - Propose timetable and analyse resource needed to run cross-site experiments/testbeds
  - Implementation and configuration advice, organise scalability/performance testing
  - Want to use [LHCONE/LHCOPN meeting in January at CERN](#) to **decide** on **Phase II**

# FABRIC: A newly funded network testbed

A new NSF funded project was just announced last week. See presentation from NRP this week <https://www.thequilt.net/wp-content/uploads/WhatIsFabric-CC-PI-Meeting-Minneapolis-2019.pdf>



# Opportunities, Questions, Discussion

Could FABRIC help us test connectivity to HPC sites in the US (and elsewhere)?

I have talked with some of the FABRIC PIs about collaboration and activities extending to Europe and GEANT, as well as some discussions with Jennifer Schopt about involving the IRNC links (trans-Atlantic) in any collaboration that would connect ATLAS/WLCG between US and Europe. There is strong interest in working with HEP use-cases.

Should connecting HPCs be part of any Network Function Virtualization Phase II effort?

**Beyond testing and prototyping, how to we move toward standardized production access (networking-wise)? LHCONE? (lots of tricky points here...NFV/SDN, centrally defined containerization ala SLATE, could help)**

Discussion?

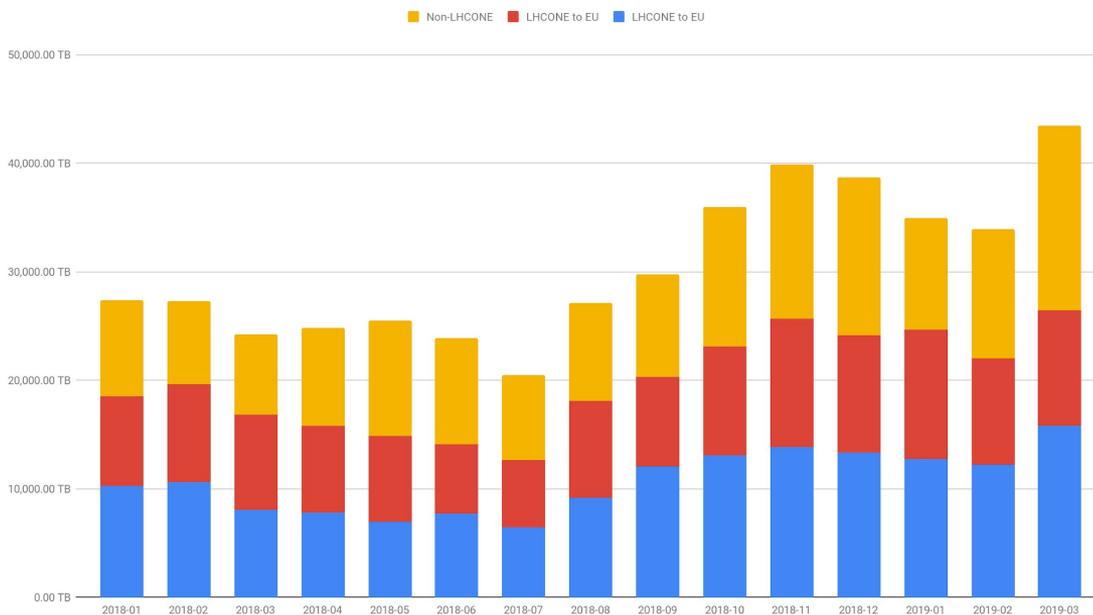
# TA Traffic Details

About 58% of ESnet TA traffic is on LHCONE

Richard Cziva / ESnet has provided a heat-map showing traffic details at:

<https://downloads.es.net/public/richard/>

Total Volume on ESnet TA Links by Month



# Trans-Atlantic Network Use on ESnet

This slides covers the predicted TA traffic from ESnet

- Data points (blue, red) are 5\*monthly avg EU<->US
- Prediction is exponential fit to max of (EU->US, US->EU)
- Prediction crosses affordable capacity in late 2020

European Demand and Capacity Forecasts (updated Aug 2019)

